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ABSTRACT

A culture assimilator is a collection of anecdotes concerning interaction of persons from different cultures in which there is opportunity for misinterpretation of the nature of the interaction of the explanation of the behavior of persons in the anecdote. Trainees are asked to read such anecdotes, and asked to consider potential explanations for the behavior at issue, after which information is given whereby the trainee can both evaluate his understanding of the situation, and be taught appropriate explanations. Two formats for structuring training in cultural assimilators were investigated. The first, a branching format, requires subjects to choose the best of four explanations. If he is correct, the basis for the correctness is expanded upon, and the trainee continues to another anecdote. If he is incorrect, the reason behind the incorrectness of the choice is given, and another choice required, continuing until the correct choice is made. The second format, called linear, requires each trainee to rate each alternative explanation of the behavior at issue in the anecdote on its correctness, after which the degree to which each is correct is explained before the trainee continues to the next anecdote. The contrast between linear and branching formats was the greatest when difficult anecdotes were examined. Unexpected effects of different sequences of linear and branching format training were discussed. (Author/JM)

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Illinois Studies of the Economically Disadvantaged

LINEAR VS. BRANCHING STRUCTURES IN THE PRESENTATION OF ACCULTURATIVE MATERIALS

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Preface

This report is part of a series which is concerned with the economically disadvantaged. We have shown in previous reports that economic disadvantages create characteristic ways of perceiving and thinking about the social environment. These ways differ from the way the mainstream views the world, and create barriers to cooperation between a disadvantaged employee and his supervisor. Such barriers make it difficult for the employee to hold a job.

The culture assimilator is a training procedure designed to explain to members of one culture how members of another culture view the world. It is hoped that such training will improve the chances of an economically disadvantaged employee to work with a boss from the mainstream.

The present paper is a technical study examining the optimal format for assimilators. It contrasts two kinds of assimilators and finds that one is most suitable for difficult items and the other for easy items. Such studies are necessary in order to learn the best way to conduct our training.

H. C. Triandis

LINEAR VS. BRANCHING STRUCTURES IN THE PRESENTATION OF ACCULTURATIVE MATERIALS

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Abstract

A culture assimilator (Fiedler, et al, 1971) is a collection of anecdotes concerning interaction of persons from different cultures in which there is opportunity for misinterpretation of the nature of the interaction or the explanation of the behavior of persons in the anecdote. Trainees are asked to read such anecdotes, and asked to consider potential explanations for the behavior at issue, after which information is given whereby the trainee can both evaluate his understanding of the situation, and be taught appropriate explanations. Two formats for structuring training in cultural assimilators were investigated. The first, a branching format, requires subjects to choose the best of 4 explanations. If he is correct, the basis for the correctness is expanded upon, and the trainee continues to another anecdote. If he is incorrect, the reason behind the incorrectness of the choice is given, and another choice required, continuing until the correct choice is made. The second format, called linear, requires each trainee to rate each alternative explanation of the behavior at issue in the anecdote on its correctness, after which the degree to which each is correct is explained before the trainee continues to the next anecdote. On the basis of an analysis of the different demands put upon the trainee by the different formats, the following predictions were made: 1) linear training would demand the construction of a judgment

criterion by the subject which is not demanded by the branching format, and therefore after an initially high error rate, linear training should result in decreasing errors over trials, surpassing branching format training. 2) Fewer anecdotes will be processed per unit of time under linear format. These expectations were for the most part confirmed. The contrast between linear and branching formats was the greatest when difficult anecdotes were examined. Unexpected effects of different sequences of linear and branching format training were discussed.

LINEAR VS. BRANCHING STRUCTURES IN THE PRESENTATION OF ACCULTURATIVE MATERIALS[1]

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Acculturation into a given culture for persons who are already competent practitioners of a different culture requires that some but not all of the individuals' previous acculturation be changed. In addition to learning new interpretations to familiar situations, the unacculturated often has to acquire appropriate behaviors to them. As Campbell's (1963) typology reflects, there are a number of ways in which old responses or old interpretations and intentions can be unlearned and new ones learned. The six most prominent are: (1) blind trial and error; (2) perception; (3) perceptual observation of another's response; (4) perceptual observation of the outcomes of another's explorations; (5) verbal instruction about responses to stimuli; (6) verbal instruction about the characteristics of objects.

Which of these methods produce the most effective learning would depend on a number of factors, but surely the most efficient method is through verbal instruction. It is perhaps for this reason that most training programs are based on this type of behavioral acquisition. The important attributes of such vicarious learning are, as Campbell suggested, the observability of the stimulus, the response, and the contingency between them in a particular setting. Using this approach, Fiedler, Mitchell and

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[1] The study reported in this paper was supported by Research Grant No. 15-P-55175/5 from the Social and Rehabilitation Service, Department of Health, Education and Welfare (Harry C. Triandis, Principal Investigator).

Triandis (1971) have developed a method of acculturation. Programmed instruction manuals, called Cultural Assimilators, have been employed to sensitize newcomers to a number of societies. The assimilators provide "critical incidents" (Flanagan, 1954) for the uninitiated to read; each incident describes critical events experienced by persons from their own cultural background when contacting members of the new or host society. The events are critical because they are typical situations in which the unacculturated makes responses inappropriate to the culture, even though this may have been appropriate to his own culture. These incidents provide a cultural setting in which the behavior occurs, a description of the outcomes of the behavior in that setting, and require the trainee to choose from a set of alternative explanations for the behavior of the actor described in the incident. Incorrect responses are corrected, and the rationale underlying the correct choices is further explained.

Although cultural assimilators were primarily developed to familiarize foreign visitors with appropriate interactions for a host culture, the procedures are also amenable to training for subculture interaction within a culture. In the context of the present research project, white trainees will be placed in a responsive environment to interact with members of a different culture, black persons, who share part of the cultural background of the trainees but who also differ in specific behaviors and in their perceptions of the appropriateness of similar behaviors. The individual who receives assimilator training in this case must be able to interpret correctly the meaning of a situation which is initiated by the behavior of a person with cultural experience different from his own. He must develop

predictions about the other, develop intentions concerning the interaction outcomes that are most valuable, and do that behavior which will attain some set of outcomes.

There are two critical questions regarding the use of assimilators in training effective interaction modes. The first concerns the transferability of learning to conceptualize appropriate behaviors via a training manual to actual interaction situations. Presumably, the more comparable training procedures are to the processes called upon in the environment of interaction the more transfer one could expect from training to these environments.

A second issue, related to the first, concerns the process by which trainees learn appropriate responses and inhibit inappropriate ones, in the context of going through an assimilator. In an on-going interaction, one theoretical analysis would suggest that a person's actions result from a decision process whereby expected outcome criteria are used to evaluate alternative actions. The person chooses behaviors contingent upon the intended outcome of the interaction and his assessment of the situation. In this context the assimilator can be viewed as an attempt to provide the person with information for making accurate estimations of outcomes and to suggest and identify the behaviors promoting desirable or undesirable outcomes. If the assimilator accomplishes these objectives then the success of its use depends on how well it can effect conditions favorable to transfer of training. An important question in making the assimilator experience similar to interaction experience concerns the nature of how a person processes alternative courses of action. In interactions occuring in natural settings, is outcome optimized or is it merely to exceed some critical value?

If outcome is to be optimized, this implies that the trainee will have to generate an exhaustive set of outcomes for an exhaustive set of alternative behaviors, estimate the value of the outcomes given the situation, evaluate the likelihood of attaining the optimal outcomes given the behavior alternatives, and choose that behavior which in that situation has the highest probability of attaining the optimal set of outcomes. If, on the other hand, some critical value of outcome is to be exceeded, the trainee need only generate outcomes and behavioral alternatives until the estimated value of the outcome given the situation and the chosen behavior exceeds this critical value. So long as the behavior is in the range of acceptable behaviors, yielding acceptable outcomes, the trainee is free to pursue it, but he need not optimize the situation. Another question is: Is the choice between these two alternatives, which we shall call optimization and sufficiency criteria, respectively, influenced by time constraints on the decision process arising from the pace of face to face interaction? It would seem that for behavior to appear to flow freely, an exhaustive alternative generating (optimization) process would be too time consuming unless the alternative-outcome pairs could be processed in parallel. It seems more reasonable that alternatives will be processed serially in a self-terminating procedure. In either case, inappropriate behavior must be rejected or inhibited until behaviors either more highly associated with important outcomes, or associated with more important outcomes are generated by the trainee until either the optimization or sufficiency criteria are reached. The trainee generates and evaluates behavioral alternatives in sequential fashion until either an alternative which falls within the acceptable region occurs, or until all alternatives are

generated and the best one selected. In either case, the trainee will learn to inhibit incorrect or inappropriate behaviors: those which fail to survive the criteria. If the process is a serial, self-terminating one, alternatives are individually compared against a stored criterion and either inhibited, going on to new alternatives, or facilitated and processing terminated. A judgment is made either to reject or to continue generating alternatives.

The incorrect accepting of alternatives which have their basis in the subjects' own cultural background is at the very core of the phenomena of ethnocentrism. Inhibiting these responses is a major task of acculturative training. When the trainee is in the environment in which he will have to perform and utilize his newly acquired cultural knowledge, he will not have a set of alternatives from which to choose, but will have to generate his own alternatives and inhibit those that are incorrect. If this analysis of the trainees task is correct, then acculturative training should provide the subject with practice in these two skills: generation of correct or new alternatives, and the inhibition of incorrect alternatives whether or not they are generated by the trainee.

Previous work using critical incidents in cultural assimilators has used a procedure where four alternative explanations of each critical incident are given in turn. The trainees task is to choose the correct one. If he chooses correctly he is told he is correct, and the rationale behind the correctness is explained. If he is incorrect, he is told he is incorrect and why, and is required to continue choosing in this manner until he is correct (or until he chooses the remaining possible alternative, which, by

that time, would be the correct one). This procedure is termed a Branching procedure. Another procedure, termed a Linear procedure, requires the subject to make an independent determination on the acceptability of each alternative in turn, ending each incident with feedback on the acceptability of the alternatives.

Assimilator training can be classified in a fourfold system representing the crossing of self-generated vs. other-generated alternatives and inhibition vs. noninhibition training. While training in generating ones own alternative explanations in a corrected trial format would perhaps be optimal as a verbal training device, it would be highly inefficient since there would have to be a pre-existing exhaustive catalog of acceptable vs. unacceptable explanations in order for this procedure to be automated, or a highly trained judge would have to be present to administer the training individually. The two kinds of training that remain, where alternatives are generated by some other person or external source, are represented by the linear and branching self-administered training materials described above. A Linear training format requires the trainee to make an independent evaluation of each alternative in turn. Most importantly, however, linear presentation requires the comparison of alternatives with some criterion of acceptability that is not present in the training materials themselves. The trainee must develop an enduring set of criteria to be used in such comparisons. It is the development of this criterion of acceptability that is the goal of assimilation training, for presumably such criterion will be used in evaluating the acceptability of behaviors in actual interactions. A branching presentation format does not require the trainee to make

comparisons of each alternative against a stored criterion. It requires that the alternatives be compared. It is not clear what is the criterion of choice under these conditions. One could hypothesize that the alternatives must be each compared against a criterion, and the most successful comparison is chosen. However, in order to perform the task successfully, a trainee could use the alternatives as memory "jogs," comparing the rationales suggested by them, and choose the alternative that suggested the rationale that is either the closest to some criterion, or that is the least obviously bad. Branching procedures would provide more opportunities for using features of the explanations themselves as criteria than is possible in a linear procedure. These "criteria" have lower probability of being correct, and of contributing to an enduring set of evaluative devices, an internal criterion, than would the criteria developed in the course of a linear procedure. The difference in the application of evaluative criteria between branching and linear procedures has some of the features of the difference between processes of recognition and retrieval in recall (Anderson & Bower, 1972).

There are two considerations in relation to which the choice between inhibitive or non-inhibitive training can be made. The first concerns transfer from training to behavior in the natural environment interaction. The second concerns the relative efficiency of the two types of training in terms of amount of material covered per unit of time and the number of correct responses attained by either type of assimilation training. A linear presentation provides for evaluation and feedback on each of four alternatives per incident whereas in the branching presentation the amount of training

the trainee obtains depends on the distribution of his errors across the four alternatives. If the subject is always correct on the first choice, he gets information merely about one alternative. If he is correct on the average, on the second choice, he on the average obtains information on two alternatives per incident. If he is correct on the third choice he gets information on three, and if he is correct on the fourth, he gets information on all four. Under the branching format as subjects make fewer errors over training, the amount of information obtained per incident will decrease. Further it will always be less than the information obtained in a comparable number of incidents in linear format providing the trainee makes fewer than three errors per incident.

We can outline the following propositions concerning the efficiency of training based on these considerations. Linear training and branching training should start at comparable error rates, where error for branching training is defined as choosing an incorrect alternative, and error is defined for linear training as rating the correct alternative as less acceptable than at least one other alternative. Since linear training immediately presents more alternatives to the trainee, and requires more development of criteria for evaluating the acceptability of alternatives, more conflicting information should be generated early in the training by trainees under the linear procedure. Therefore, relatively early in training, the trainees should make greater errors on linear materials than on branching materials. After a longer period of training, the linear training should result in a decrease in errors as the construction of criteria for evaluating incidents or alternatives becomes more articulated by the subject. Subjects

in branching presentation should make fewer errors, because they are learning to use cues provided in incidents more effectively, but should be less able to generate correct rationale for incidents, and thus should perform less well in a transfer task.

Because the subject must make more decisions in the linear training than in the branching training, linear training should be slower in time, but since the amount of information given in linear format is ultimately higher in terms of the information per incident this loss of time in linear training should be offset. Furthermore in linear training, one should be able to observe a polarization of acceptability ratings for the incorrect alternatives and the correct alternative, increasing with training.

The investigation reported here concerns only the comparison of linear and branching structures on subjects error rate and number of incidents per unit of time. Questions of transfer and ultimate effectiveness of training by these procedures, while the more important, is necessarily deferred until validation studies are undertaken.

Method

An experiment was conducted to examine whether linear and branching processing methods increase accuracy across two blocks of twenty assimilator items. The basic design called for subjects to go through two assimilator booklets; half of the subjects used the linear method for the first set while the others used the branching method. Each of these groups were then divided into linear and branching on the second set. In all, the four processing groups were LL, LB, BL, BB.

Subjects

Sixty University of Illinois undergraduates, most in their junior year, took part in the experiment. They were recruited from the Department of Business Administration and the Department of Psychology subject pools. Subjects were administered materials in groups of 8 to 15 in large classrooms where they were spaced to avoid distraction or collaboration.

Materials

Twenty pairs of "critical incident" items of various descriptions of interpersonal conflict and misperception in work settings involving blacks and whites were selected for the experiment. They were selected from the pool of available items, the general form of which is described by Fiedler, Mitchell and Triandis, (1971). Individual members of each pair of items in each category were randomly assigned to either Set 1 or Set 2. The order of items within each set was then randomized and assembled into two booklets.

Each item was composed of two parts, a problem statement and a solution section. The problem statement was contained on a single 8 x 11 inch page, and included a description of an incident involving a black and white interpersonally in a work situation. Following this description, the problem is posed on a separate page as a question soliciting an explanation. The question was then followed with four alternative answers, labeled alternatives A, B, C, D. In the solution section of the item, the four alternative answers were identified as correct or incorrect on four separate pages following immediately behind the statement of this problem. A brief explanation as to why the alternative was correct or incorrect accompanied each answer. These six sheets of paper were stapled together to delineate each item.

Procedure

All subjects were given the same order of items within booklets, and also most subjects were given the Set 1 booklet prior to Set 2. A small sample of subjects were given a Set 2-Set 1 order to determine if this made a difference; no differences could be reliably observed, and all analyses below combine subjects with Set 1 referring to the first set of twenty items taken and Set 2 referring to the second set.

Each group of subjects was run with two experimenters to provide ample facility for answering inquiries individually; both experimenters were white. One experimenter described the tasks to the subjects while the other passed out materials for the first set.. The experiment was described as part of a larger project aimed at developing training materials for training blacks and whites to promote more effective and compatible interaction in job settings. The specific purpose of the present experiment was described as concerned with testing various orders of item presentation for their contribution to learning over a set of trials. In addition, the present study sought to examine how different presentation modes would facilitate learning. Subjects were told that some of them would be asked to use a "branching" method and others a "linear" method on the first set and that they would in addition switch off on the second set.

Detailed instructions were given as to how linear and branching subjects were to record their responses. These are included here as Appendix A. Illustrated solutions were presented on the blackboard. For the branching instructions, the letters A, B, C and D were put on the board and subjects were told how to proceed depending on which alternative they chose as

representing the "best" answer to the question posed. If they chose "A" they were to proceed to page 3 to read whether their selection was correct or not. If correct, they were to proceed to the next problem item. If incorrect, they were to return to the second page and re-read the alternative solutions and select among the three not yet chosen. They were to repeat this process until the correct solution was selected and then would go to the next problem. The page to turn to for each alternative was written on the board: For A, page 3; for B, page 4; for C, page 5; for D, page 6.

For the linear instructions, the rating scale, with numbers from 0 to 9 was written on the blackboard, and a corresponding probability scale from 0 to 100% was set above it. Subjects were told that their task was to look at each alternative in turn and make a judgment as to how likely this alternative was the correct explanation to the problem as posed. If they thought the alternative was very likely they were to write "9" alongside that alternative; if they thought it was entirely unlikely, they were to write "0". If they thought it had any intermediate probability of being correct, they were to select a number appropriate to their thinking. Subjects were also told that more than one alternative could have the same judged probability of being correct. After subjects had made their judgments for each of the four alternatives, they were to turn to the next four pages and read the explanations as to which one was considered correct and which one was incorrect. They were also told not to go back and change their previous judgments, but to proceed to the next item.

Answer sheets for the linear and branching instructions were similar. Instructions were briefly repeated at the top, and the rating scale was

printed for this linear group. Four columns were horizontally placed along the top, labeled A, B, C, D with short blank lines following below them. A fifth blank was presented at the left for the subjects to write in the item number of each problem. In the blanks under the columns A, B, C, D, linear subjects were to write in the number corresponding to the scale value they judged for each alternative. Branching subjects were to write in a number from 1 to 4 representing the order in which they chose each alternative and the point at which the correct alternative was chosen. Thus, if the number "1" were placed under alternative B and no other numbers were placed for that item, it indicated the subject chose the correct alternative (B) on the first choice.

To insure subjects understood their respective instructions, all subjects were asked to do the first problem to Set I and the experimenters examined their executions. The subjects then proceeded with the remaining problems. At the start of the second problem of the first set, subjects were asked to write down the time read from the experimenter's watch. At various periods throughout, the experimenter asked subjects to mark the time alongside the problem they were doing. In addition, the time was noted when a subject completed his set of problems.

The instructions for the second set of problems were repeated, since some subjects who had been using a branching method on the first set were to use a linear method on the second, and vice versa. The times were also recorded on the second set as on the first, starting with the second problem, and ending with the subjects' completion of that set.

Dependent Measures

Two measures were obtained for evaluation of the manipulation. Processing rate was computed based on the time estimates made for each subject, and is expressed as the number of problems finished per minute. Correct solutions refers to the estimates of the number of problems which the subject correctly completed. This measure is equivalent for both the linear and branching methods, but is obtained differently for them. For the branching method, a correct solution is obtained when the subject selected the correct alternative on the first choice. For the linear method, a correct solution is obtained when the subject rated the correct alternative higher than the three other alternatives. Thus, for both linear and branching, correct solutions are defined as the designated corrected alternative being first ranked out of four; the chance probability of each being .25.

Results

Processing rates and correct solutions were computed for each subject for each twenty items of Set 1 and Set 2. Linear and branching methods used by a subject on Set 1 and Set 2 were taken as between subjects factors and Set 1 and Set 2 were taken as a within subject factor in an analysis of variance of the two dependent measures. Thus, the analysis is a 2 x 2 x 2 with two levels of methods for Set 1, two levels for Set 2, and two sets. Unweighted means ANOVA was used, as n's were not equally distributed in four cells.

Processing rates. As expected, the linear method requires more time than the branching. The average processing rate on Set 1 problems for those with linear instruction on Set 1 is .67 problems per minute compared to .86

for branching subjects, and the average rate for both on Set 2 is .82 and .80, respectively (Table 1). This interaction of Set by Set 1 -- instructions is significant ($F(1,56) = 12.83$, $p = .001$). The average Set 2 processing rate for those with linear instructions on Set 2 is .74 problems per minute compared to .88 for those with branching instructions, while the means of both groups for Set 1 problems is .77 and .75, respectively ($F(1,56) = 6.13$, $p = .02$).

In addition to the effect of method on the processing rates under those instructions, there is a carryover effect for instructions on Set 1. The average processing rates for both Set 1 and Set 2 for subjects using the linear method on Set 1 is .743 problems per minute and .829 for branching subjects ($F(1,56) = 3.37$, $p = .07$). The only other general effect is improvement in processing rate from Set 1 to Set 2, regardless of instructions; The average being .761 for Set 1 and .812 for Set 2 ($F(1,56) = 3.15$, $p = .08$).

In summary, subjects can do more problems per minute using a branching method than a linear rating method, obviously due to having to consider more information per problem in the latter. Taking those subjects who had used a linear method for both Set 1 and Set 2, the average processing rate is .705 or about 42.3 problems per hour compared to .845 or 50.7 problems per hour, for those who had used a branching method across both Set 1 and Set 2.

Correct solutions. The effects for correct solutions are not as simple as those for time. There is a general increase in the number of solutions from Set 1 to Set 2. The mean number of solutions for Set 1

Table 1

Processing Rate as a Function of Linear or Branching Instructions on Set 1 or 2. Mean Problems Per Minute

		Response on		Differential Improvement
		Set 1	Set 2	Set 2-Set 1
Instructions:				
Set 1	Linear	.67	.82	.15
	Branching	.86	.80	-.06
Set 2	Linear	.77	.74	-.03
	Branching	.75	.88	.13
Overall		.761	.812	

problems, regardless of instructions, is 12.4 (out of 20) and 13.4 for Set 2 ($F(1,56) = 6.12$, $p = .02$). However, the improvement from Set 1 to Set 2 varies as a function of both Set 1 and Set 2 instructions (Table 2). Subjects who had linear instructions on Set 1 made slightly more correct solutions on Set 1 than branching subjects (12.73 vs. 12.06), however, they showed no improvement on Set 2, while branching subjects increased their correct solutions (12.75 vs. 13.94). The interaction of Set 1 instructions with Set 1 and Set 2 responses is significant ($F(1,56) = 5.90$, $p = .02$). The effect of Set 2 instructions on Set 2 responses is more or less as expected. The average number of correct solutions to Set 2 for those using the linear method on Set 2 is 14.04 compared to 12.67 for those using the branching method; in contrast, their Set 1 responses were only slightly different, with means of 12.06 and 12.73, respectively. The interaction of Set 2 instructions with Set 1 and Set 2 responses is significant ($F(1,56) = 7.00$, $p = .01$), and indicates that by Set 2, the linear method is superior to the branching.

The effects of processing methods on correct solutions can be illustrated by examining the differential improvement from Set 1 to Set 2 for the four instructions groups LL, LB, BL, and BB. Table 3 presents the mean improvement scores for each group. The two groups who used the same methods for both Set 1 and Set 2 (group LL and group BB) improve equally well, increasing their correct solutions by 1.5 for the LL group and 1.4 for the BB group. However, the two groups who switched processing methods from Set 1 to Set 2 react differentially. The group that used a linear method on Set 1 and a branching method on Set 2 actually <u>decreased</u> in

Table 2

Mean Number of Correct Solutions as a Function of Linear or Branching Instructions on Set 1 or Set 2

Instructions		Response-on Set 1	Response-on Set 2	Differential Improvement (Set 2-Set 1)
Set 1	Linear	12.74	12.75	.01
	Branching	12.05	13.94	1.89
Set 2	Linear	12.06	14.04	1.98
	Branching	12.73	12.67	-.06
Overall		12.40	13.35	

Table 3

Mean Number of Correct Solutions as a Function of Combinations of Linear and Branching Instructions on Set 1 and Set 2

Instructions Set 1/Set 2	Response on Set 1	Response on Set 2	Average of Both
L/L	12.4	13.9	13.1
L/B	13.1	11.7	12.4
B/L	11.8	14.2	13.0
B/B	12.3	13.7	13.0
Overall	12.4	13.4	12.875

number of correct solutions by an average of 1.4, while the group switching from a branching method on Set 1 to a linear method on Set 2 improved their performance by an average of 2.4 correct solutions.

Thus, in summary, there is no simple effect for linear and branching processing in terms of correct solutions. The subjects who used either of those methods for each set of twenty items produced the same number of correct solutions (13.1 and 13.0, respectively, for both sets) and showed similar improvement from Set 1 to Set 2 (1.5 and 1.4, respectively). What makes a difference is the processing method of Set 2 relative to that of Set 1. It seems that subjects who previously made choices between alternatives on Set 1 do much better when later asked to rate each alternative for its correctness, while subjects who are first given a lot of information (under linear instructions) make only slightly more discrimination and when they are forced to choose under more limited information conditions (branching instructions) and are actually less able to correctly discriminate. Subjects given branching and then linear format may be more able to make discriminations about appropriate responses when they are first forced to do so with limited information (under branching instructions) and then allowed to deal with more information (under linear instructions). On the other hand, subjects given linear and then branching procedures may not have developed the principles required for making the discriminations demanded in the branching processing method. Another possibility is that subjects given linear before branching do not learn to use criterion-unrelated cues which are available in the alternatives themselves for ordering alternatives until they work on the second set of

incidents. If linear procedures foster greater development of a criterion of behavioral acceptability, then those who have branching instructions first will have learned to use non-criterion related attributes of alternatives in making their judgments on the first set and will be superior on the second set to whose who are operating on the same incidents, under branching instructions. Increases in cultural knowledge will add together with use of criteria unrelated cues to produce higher performance levels. Another implication of this argument, not testable in the present study, is that to the extent that assimilator performance is based on the use of non-criterion related cues in the alternatives, performance will be unrelated to performance in transfer tasks to natural environments of intercultural interactions.

Another alternative is that subjects switching from branching to linear may improve because choice experience of Set 1 is more efficient for problems which were easy and require little discrimination while on the second set they improve by using the more discriminatory linear method on difficult problems. Thus, the differential effects for switching from one method to another may be due to a use of those methods for two types of problems, one type being relatively easy and the other being relatively difficult. For difficult problems, the linear method may be more effective in that it provides for more discrimination where needed; while for easy problems, the branching method may be more effective, in that the linear methods would introduce information which confuses an otherwise obvious choice.

To examine the possibilities that linear and branching methods have differential effectiveness for easy and hard problems, an analysis was conducted for both types of problems.

Easy and Hard Problems

Problems were defined as easy or hard depending on whether the alternatives were clearly discriminated or not. A problem could be considered hard if subjects do not discriminate one alternative answer as better than another, but select them equally often. Similarly, a problem can be considered easy if subjects completely discriminate one alternative from another, and select one always and the other never. To make the designations with the present problems, the distribution of all responses across the four alternative answers was computed for each of the twenty items in Set 1 and in Set 2. The items within each set were then arrayed from most discriminated to least discriminated by taking the average response distance between the two top ranked alternative answers to each item. Thus, for instance, if for an item half of the subjects had ranked alternative A first in correctness (by either rating it highest in the linear method or choosing it first in the branching method) and half had ranked alternative B first in correctness, then the difference between these two alternatives for this item is nil. In contrast, if all subjects had ranked an alternative A first and none had ranked alternative B first, then the difference between the two is maximal. Having arrayed all twenty items within Set 1 and Set 2 by this method, the first seven were selected from Set 1 to represent "hard" items and the remaining 13 were

designated "easy" items. In Set 2, eight items were designated "hard" and 12 were designated "easy". The reason eight items were designated "hard" in the Set 2 items was because the eighth ranked item in the array of difficulty was as difficult as the previous seven and more difficult than the remaining 12.

Because of the unequal numbers of items designated as easy and hard under Set 1 and Set 2, the analyses which follow use "percent correct" as the dependent measure. Means are shown in Table 4.

Easy items. As expected from the previous discussion, there is a main effect for the Set 1 instructions on correct solutions; subjects using the linear method on Set 1 overall did worse than those using a branching method on Set 1, regardless of the method used on Set 2, with means of 71.9 and 79.9 percent correct, respectively ($F(1,56) = 9.08$, $p = .004$), as shown in Table 5. Moreover, there is a general improvement from Set 1 to Set 2, regardless of processing methods. The mean percent correct on Set 1 being 73.7% and 78.2% on Set 2 ($F(1,56) = 4.59$, $p = .04$). The differential improvement from Set 1 to Set 2 for those under the linear and branching instructions on Set 1 is also significant (Table 5). For those using a linear method on Set 1, the mean correct is 71.6% which increases to 72.3% for Set 2; while those using a branching method on Set 1 have 75.8% correct on Set 1 and 84.0% correct on Set 2; the interaction suggests they improve much more as a consequence of using the branching instructions on Set 1 ($F(1,56) = 3.28$, $p = .08$). On the other hand, those who used the linear method on Set 2 did significantly better than those who used the branching method on Set 2, with means of 80.6%

Table 4

Percent Correct Solutions as a Function of Linear or Branching Instructions on Set 1 or Set 2, Separately for Easy and Hard Items

Easy Items

Instructions Set 1/Set 2	Response on Set 1	Response on Set 2	Average of Both
L/L	71.92	77.92	74.80
L/B	71.31	66.67	69.08
B/L	73.38	83.33	78.16
B/B	78.23	84.75	81.36
Overall	73.69	77.96	

Hard Items

Instructions Set 1/Set 2	Response on Set 1	Response on Set 2	Average of Both
L/L	42.86	56.25	50.00
L/B	55.29	45.88	50.27
B/L	31.86	52.88	43.07
B/B	31.00	43.75	37.80
Overall	40.29	49.63	

Table 5

Proportion of Correct Responses to "Easy" Items as a Function of Linear and Branching Instructions on Set 1 or Set 2

Instructions		Percent Correct On Set 1	Percent Correct On Set 2	Average of Both	Improvement Set 1 - Set 2
Set 1	Linear	71.6	72.3	71.9	.7
	Branching	75.8	84.0	79.9	8.2
Set 2	Linear	72.6	80.6	76.6	8.0
	Branching	74.7	75.7	75.2	1.0
Overall		73.7	78.2		

and 75.7%, compared to 72.6% and 74.7% on Set 1 ($F(1,56) = 2.84$, $p = .10$).

In short, the branching method is better for easy problems than the linear method. Subjects who used a linear method for both Set 1 and Set 2 problems were correct on about 74.9% of their answers, while those using the branching method for both sets were correct on 81.5% of their answers. Moreover, switching from branching to linear produces an increment in performance, whereas switching from linear to branching produces a decrement. Some interpretations of the pattern are given above.

Hard items. The hard items as defined for this analysis are indeed hard, for the average percent correct is only 44.9% compared to an average of 75.9% for the easy items. However, how hard the items are is partly a function of processing method; as expected, in contrast to easy items, the linear method is superior to the branching method for hard items. There is a main effect for instructions on Set 1. The average percent correct for those using the linear method on Set 1 is 50.0% compared to an average of 39.9% for those using a branching method ($F(1,56) = 8.42$, $p = .005$). There is also an improvement from Set 1 to Set 2, with 40.2% of the hard items being correct on Set 1 and 49.7% being correct on Set 2 ($F(1,56) = 6.96$, $p = .01$). Similarly, the differential improvement from Set 1 to Set 2 is affected by both Set 1 and Set 2 instructions (Table 6). The percent correct on Set 1 for those using linear method on Set 1 is 49.0% and 31.4% for those using the branching method, while their responses on Set 2 are about equal, with means of 51.0% and 48.3%, respectively; the interaction is significant ($F(1,56) = 4.33$; $p = .04$). Similarly, Set 2

Table 6

Proportion of Correct Responses to "Hard" Items as a Function of Linear and Branching Instructions on Set 1 or Set 2

Instructions		Percent Correct On Set 1	Percent Correct On Set 2	Average of Both	Improvement Set 1 - Set 2
Set 1	Linear	49.0	51.0	50.0	2.0
	Branching	31.4	48.3	39.9	16.9
Set 2	Linear	37.4	54.6	45.9	17.2
	Branching	43.1	44.8	43.9	1.7
Overall		40.2	49.7		

instructions have a significant effect on improvement from Set 1 to Set 2. Those using the linear method on Set 2 improve their percent correct from 37.4% on Set 1 to 54.6% on Set 2, while those using the branching method on Set 2 improve only slightly from 43.1% to 44.8% ($F(1,56) = 4.68$; $p = .03$).

In summary, the linear method is superior to the branching for hard items. Those subjects who used a linear method for both sets had an average correct response of 49.6%; while those using a branching throughout have an average of 37.4% correct.

Summary and Discussion of Results

The main findings regarding the differences between linear and branching methods of processing alternative explanations to critical incidents involving whites and blacks are (1) that the linear takes more time, (2) that the linear is superior on items which are relatively difficult, and (3) that the branching is superior on items which are relatively easy. In addition, in using one method consistently or switching from one to another, the following pattern seems to hold across both easy and hard items. Subjects who consistently use a linear method or consistently use a branching method improve on both easy and hard items, but those using linear method improve more on hard items. On the other hand, subjects who switch from a linear to a branching mode show a decrement in performance; whereas those who switch from a branching to a linear mode show an increment in performance. This is interpreted as due to increased use of criterion irrelevent cues resulting from the initial branching training.

It was expected that the linear method of processing alternatives would be increasingly effective as the number of items increased.

This seems to be the case. The subjects using a linear method on the second set of twenty items do significantly better than those using a branching method, for both hard and easy items, although both are relatively equivalent on the first set.

In short, the pattern of results suggests that the linear method provides a means for the subject to discriminate the alternative answers better than does the branching method. This shows up in both the difference between those methods on easy and hard items. On hard items, where more discrimination is needed, the linear is superior; on easy items, the linear is inferior, because 1) making discriminations only adds information which produces confusion to otherwise obvious answers, and 2) the response is not a comparative one and the use of criterion unrelated cues in the alternatives does not influence the ratings less.

As to which method would produce the best training, or have the greatest effect in improving actual interpersonal responses following training, the answer is difficult to extrapolate from these findings. On the one hand, it depends on the nature of making interpersonal responses prior to training, during training and after training, and on whether the interpersonal situations one faces are obvious ones or more difficult. If the normal mode of processing potential interpersonal responses is one similar to the branching method here, then a training method which forces a subject to consider all alternatives (the linear method) would produce superior training, as evidenced by the positive transfer from branching to linear in this study. However, it is not clear whether a subject would be able to transfer such training from a linear training

session to a branching interpersonal situation, if indeed that is the nature of the interpersonal response situation. The decrement in performance from a linear to a branching mode is surprising. However, it would be premature to extrapolate on the basis of this single study to real interpersonal situations. What is needed is a series of experiments in which the switching from linear to branching across numerous types of items of varying difficulty is more systematically varied. One thing that is clear from this study is that the difficulty of the item is an important dimension of the appropriate response decision mode.

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A P P E N D I X A

Instructions

Instructions for Branching Rating Task

We are testing materials which will be used to train white and black supervisors and workers to interact more easily and profitably. Before going to the field, it is essential that we find out how easy or difficult various sequences of these training materials are. Therefore, we are asking you, because of your interest in management to provide us with this initial information.

We would like you to read a number of incidents describing interactions between blacks and whites in job settings. Following each incident will be provided a set of alternative explanations for some aspect of the behavior of the participants in the incddents. We would like you to examine the explanations and select the alternative you believe to be the best answer or explanation for the question. Mark your first choice on the answer sheet by placing a 1 in the blank under your first chosen alternative. For example, if on item 25 you believe the correct choice is Alternative 2, your answer sheet will look like this:

Incident #	Alternative 1	Alternative 2	Alternative 3	Alternative 4
25	____	1	_____	_____

After you have marked your answer proceed to the page indicated to learn if your choice was correct. If you pick alternative 1 go to page 3, if 2 go to page 4, if 3 to page 5, if 4 to page 6. If it is incorrect, go back and reread the incident and record your next best choice by placing a 2 in the appropriate blank. These steps are to be repeated as necessary.

In addition, because we are testing this material, we have sequenced questions differently for different individuals. One of the questions we are interested in is finding out which sequence is easiest and most effective. Therefore, at various times throughout the session, we will ask you to write down the time on the answer sheet next to the number of the incident you are working on at that time.

Instructions for Linear Rating Task

We are testing materials which will be used to train white and black supervisors and workers to interact more easily and profitably. Before going to the field, it is essential that we find out how easy or difficult various sequences of these training materials are. Therefore, we are asking you, because of your interest in management to provide us with this initial information.

We would like you to read a number of incidents describing interactions between blacks and whites in job settings. Following each incident will be provided a set of alternative explanations for some aspect of the behavior of the participants in the incidents. We would like you to examine each explanation and record the degree to which you believe each alternative to be correct on a scale from 0 to 9 by recording the appropriate index number from the rating scale at the top of the answer page. For example, if on item 25 you believe that Alternative 1 would be correct most of the time, your answer sheet would look like this:

How correct is each explanation? 0 1 2 3 4 5 6 7 8 9

Incident #	Alternative 1	Alternative 2	Alternative 3	Alternative 4
25	8			

Evaluate the degree of correctness of all four alternatives and then proceed to each of the following pages to find out which answers are the most acceptable.

In addition, because we are testing this material, we have sequenced questions differently for different individuals. One of the questions we are interested in is finding out which sequence is easiest and most effective. Therefore, at various times throughout the session, we will ask you to write down the time on the answer sheet next to the number of the incident you are working on at the time.